National Institute of Environmental Health Sciences

The role of imported cases and favorable meteorological conditions in the onset of dengue epidemics

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Abstract:

BACKGROUND: Travelers who acquire dengue infection are often routes for virus transmission to other regions. Nevertheless, the interplay between infected travelers, climate, vectors, and indigenous dengue incidence remains unclear. The role of foreign-origin cases on local dengue epidemics thus has been largely neglected by research. This study investigated the effect of both imported dengue and local meteorological factors on the occurrence of indigenous dengue in Taiwan. METHODS and PRINCIPAL FINDINGS: Using logistic and Poisson regression models, we analyzed bi-weekly, laboratory-confirmed dengue cases at their onset dates of illness from 1998 to 2007 to identify correlations between indigenous dengue and imported dengue cases (in the context of local meteorological factors) across different time lags. Our results revealed that the occurrence of indigenous dengue was significantly correlated with temporally-lagged cases of imported dengue (2-14 weeks), higher temperatures (6-14 weeks), and lower relative humidity (6-20 weeks). In addition, imported and indigenous dengue cases had a significant quantitative relationship in the onset of local epidemics. However, this relationship became less significant once indigenous epidemics progressed past the initial stage. CONCLUSIONS: These findings imply that imported dengue cases are able to initiate indigenous epidemics when appropriate weather conditions are present. Early detection and case management of imported cases through rapid diagnosis may avert large-scale epidemics of dengue/dengue hemorrhagic fever. The deployment of an early-warning surveillance system, with the capacity to integrate meteorological data, will be an invaluable tool for successful prevention and control of dengue, particularly in non-endemic countries.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2914757

Resource Description

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☒

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Human Conflict/Displacement, Meteorological Factors, Meteorological Factors, Precipitation, Solar Radiation, Temperature

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

Other Geographical Feature

Other Geographical Feature : subtropical

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Taiwan

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Dengue

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

Climate Change and Human Health Literature Portal

A focus of content